

INTEGRATOR



Northern
Great
Plains
Research
Laboratory

Our Vision:

*An economically sustainable
and environmentally sound
agriculture.*

Inside this issue:

Control of Leafy Spurge by Sheep Grazing	2
History of Northern Great Plains Research Laboratory	2
Hamburger Taste Test	3
Quantifying the Effects of a Dust Bowl	3
NGPRL Personnel News	3

USDA-ARS Northern Great Plains Research Laboratory

Mandan, ND

Looking to the Future — Building on our Past

Greetings from the Northern Great Plains Research Laboratory in Mandan, ND. At our last Customer Focus Group Meeting, a suggestion was made that we more effectively get our research into the hands of those who can use it. After some discussion, we decided to produce a newsletter from the laboratory. We had some fun choosing the name for the newsletter and settled on the Northern Great Plains Integrator. From the title, you can tell we are interested in issues and concerns of agriculture in the Northern Great Plains. Though we have not defined any real boundary to this region, we are thinking specifically about those areas within the Great Plains that have very cold winters and extreme variation in precipitation. The word 'integrator' describes our mission as a research laboratory. We hope to integrate sound scientific principles into practical and usable management practices for crop, forage, and livestock management. These principles will include concepts concerning disease and weed control, soil resource management, global climate change, water management, and pesticide use.

Our laboratory continues to grow. We are currently negotiating with a scientist to fill our Animal Nutritionist position. Our candidate is well qualified to conduct research in the Northern Great Plains, works well with producers, and increases our ability to meet the needs of livestock producers in this region.

As the growing season approaches, we are busy getting our research lined up for this year. At our Customer Focus Group Meeting, I mentioned that we are interested in working with producers on their land. My offer still stands. If you are interested in participating at some level with our research program, please call me. We are currently trying to arrange a cooperative research effort working with the National Forest Service to evaluate various management scenarios on rangeland within the Little Missouri National Grasslands. Our objective is to determine the ability of rangeland soils to store carbon under different types of management. We will keep you informed about our success in organizing this work.

Lastly, this is our first attempt at providing you information through a newsletter. Please read the newsletter and give us feedback. Let us know what types of articles you would like to read. We are also interested in the concept. If done properly, will this endeavor provide you the kind of information you need? Please send your comments to Mark Liebig, our newsletter editor.

Jon Hanson
701 667-3010
jon@mandan.ars.usda.gov



Staff of the USDA-ARS Northern Great Plains Research Laboratory

Control of Leafy Spurge by Sheep Grazing

Leafy spurge is a serious invasive plant on native rangelands across the Northern Great Plains and northwestern United States. This plant has been difficult to control with herbicides because of expense and collateral damage to other plants and water supplies.

Some farmer/ranchers have had success in controlling leafy spurge by sheep grazing. Ron Ries and Jim Karn, research scientists at NGPRL, conducted an on-ranch project evaluating leafy spurge from 1996-1998 in the Heart River Drainage of North Dakota.

The use of sheep as a biological con-

trol of leafy spurge was evaluated on infested rangeland. In June of 1996, 10 locations within 4 range sites (overflow, silty, shallow, and woody draw) were identified and caged on 320 acres. Leafy spurge population numbers and dry matter production were not consistent on all range sites and years during 1996-1998. Changes in weather conditions affected leafy spurge population numbers and dry matter produced at the different range sites each year.

After grazing with 280 Rambouillet ewes and 280 lambs during the 1998 season, leafy spurge dry matter production

was measured inside and outside the cages that excluded grazing. Sheep grazed significant amounts of leafy spurge from the 320 acre study area even though it was part of a 2200 acre pasture. The tight flock behavior and the tendencies to trail into the wind resulted in excellent utilization of leafy spurge across the total pasture by the sheep. However, the sheep did not graze all range sites equally. The sheep preferred the range sites that were at higher elevations with significant air movement that reduces insect and provides cooler conditions.

(Continued on page 4)

History of Northern Great Plains Research Laboratory: 1912-1945

The Northern Great Plains Research Laboratory has a long and varied history. It started when the local citizens of Mandan, ND began to petition Congress for a Federal experiment station in 1908.

They were quite persuasive and the U.S. Congress authorized a research station to be established near Mandan on August 8, 1912. It is a little known fact that the Mandan citizens group that petitioned for the station also purchased 320 acres of the land, which they leased to the federal government through 2010 for one dollar. However, the state later reimbursed them and took over the lease (which is currently being renegotiated).

With the arrival of personnel in 1913, the original research program focused on crop rotations, forestry, horticulture (fruit trees), and range capacity. The decade ended with 2,080 acres and 14 buildings on the station.

The 1920s brought an expansion of research activities with the addition of a wheat breeding program in 1925 and a



Entrance to the Northern Great Plains Research Laboratory, 1913.

dairy research unit in 1928. The 1930s, however, were a turbulent time at the station. In 1933, the station continued its expansion with the establishment of a plant propagation nursery to support erosion prevention. Then, a major downsizing occurred when the wheat breeding program was dropped and the personnel were transferred to other locations in 1934. In 1935 the station began a long period of multi-agency cooperation

when the soil erosion nursery was transferred to the operational control of the Soil Conservation Service (SCS). Expansion began again in 1936 when an intensive grass-breeding project was initiated and several buildings were added as WPA projects.

The 1940s brought substantial changes in station administration and continued the station's expansion. In 1945, all research projects were transferred from the Division of Dry-Land Agriculture to the respective divisions responsible for the line of research. A new dry-land soils and irrigation research program and laboratory were established. This increased research on soils and brought a considerable increase in station personnel.

(This is the first installment of a three-part article.)

Jeff Fehmi
fehmi@mandan.ars.usda.gov
701 667-3006

First NGPRL Hamburger Taste Test Sends Grass-fed Beef Back to Pasture

On February 24, 2000 a hamburger taste test was conducted at the Northern Great Plains Research Laboratory. Using employees of the laboratory as a taste panel, Jim Karn along with fry-cooks John Hendrickson and Mary Kay Tokach, prepared three different types of hamburger: 'diet lean' (93% lean), 'lean' (81% lean), and grass-fed beef. The 'diet lean' and 'lean' hamburger was purchased at a local grocery store, while the grass-fed beef was one of three steers slaughtered the previous fall following summer pasture experiments. The steer had been grazing smooth brome grass and western wheatgrass for at least 30 days prior to slaughter.

Of the 35-member taste panel, 46% preferred the 'diet lean', 20% preferred

the 'lean', while only 9% preferred the grass-fed hamburger. Seventeen percent of the taste panel did not distinguish between the 'diet lean' and 'lean' hamburger.

Results of the taste panel are supported by published data. Flavor seemed to be the primary factor causing grass-fed hamburger ratings to be so low. Some of the more descriptive comments for the grass-fed beef were that it tasted fatter, boring, bad, unusual, fishy, flat, poor, skunky, good, and very good. In the literature, grass-fed beef is often described as having a grassy or off flavor. It is interesting to note that while some people had very negative opinions of grass-fed beef flavor, others perceived it as more neutral, and a few people even

preferred it (if nothing else, it tells us something about the range of taste discrimination among employees at NGPRL).

Grass-fed beef is usually said to be too lean. The beef from this particular steer, however, had more fat than the 'diet lean' beef, which judging from the pan after cooking had almost no fat and should have been very dry.

The first hamburger taste test at NGPRL was fun for all who participated, and given the range of discriminating taste buds in the group, it may be something that's done again.

Jim Karn
701 667-3009
karnj@mandan.ars.usda.gov

Quantifying the Effects of a Dust Bowl

Scientists with the Agricultural Research Service have quantified the wind erosion hazards of a wheat-fallow cropping sequence when a serious drought strikes.

Working in conjunction with researchers in Texas, scientists at the Northern Great Plains Research Laboratory measured both soil and crop factors of wind erodibility during the drought of 1988-1990 as well as in wetter years from 1992 to 1994. By applying a model of actual wind erosion measurements in farmers' fields to wind erodibility data, wind erosion hazards were quantified in a realistic manner.

No-till was found to be much more

protective against wind erosion than conventional-till on an ordinary non-erodible soil during years with near average rainfall. During a drought period, however, soil and crop factors of wind erodibility were found to deteriorate together to a point to where no-till could not effectively protect



Collecting soil for wind erodibility measurements.

against wind erosion. From other research, it is known that on sandier and more fragile soils, breakdown effects from drought can be worse.

A full report of this research has been recently published in the Soil Science Society of America Journal (Merrill, S.D., A.L. Black, D.W. Fryrear, A. Saleh, T.M. Zobeck, A.D. Halvorson, and D.L. Tanaka. 1999. Soil wind erosion hazard of spring wheat-fallow as affected by long-term climate and tillage. *Soil Sci. Soc. Am. J.* 63:1768-1777).

Steve Merrill
701 667-3016
merrills@mandan.ars.usda.gov

NGPRL Personnel News: National and Regional Awards, New Scientists

Awards

Dr. Jon D. Hanson, Laboratory Director/Research Leader, and Dr. John D. Berdahl, Research Geneticist (Plants), were each presented the 1999 Outstanding Achievement Award from the Society for Range Management at the annual meeting in Boise, ID on February 16, 2000.

Dr. Hanson was recognized for his contribution to management and ecology of rangelands through developing, validating, and using simulation models to evaluate ecosystem

responses. Dr. Berdahl was recognized for his contributions in the development of Reliant and Manska intermediate wheatgrass and Mankota Russian wildrye cultivars.

Audrey Myers was presented the 1999 USDA-ARS Northern Plains Area Secretarial Support Award of Excellence for outstanding performance of secretarial duties in support of the mission and goals of the Northern Great Plains Research Laboratory of Mandan, ND.

Bruce Boehm, biological science technician for Dr. Al Frank, received the 1999 USDA-

ARS Northern Plains Area Scientific Support Award of Excellence for quality work and extra effort in establishing research sites for evaluating the role of grasslands in the global carbon cycle.

New Scientists

Four new scientists have joined NGPRL since June 1999. They are Jeff Fehmi, John Hendrickson, Holly Johnson, and Mark Liebig. Holly, John, and Jeff are rangeland scientists and Mark is a soil scientist.

INTEGRATOR

Newsletter of the Northern Great Plains
Research Laboratory

United States Department of Agriculture
Agricultural Research Service

USDA-ARS-NGPRL
1701 10th Ave., S.W.
Mandan, ND 58554-0459

Phone: 701 667-3001
Fax: 701 667-3054



Upcoming Events

Northern Great Plains Research Laboratory Summer Tour

July 6th, 2000

1-3:30 p.m.

Tour of station grounds and
laboratory facilities

3:30 p.m.

Registration

4-7 p.m.

Tour of field experiments

7-8 p.m.

Barbeque and speakers

Hope to see you there!



PASS IT ON!!!

Feel free to pass on this issue of *Northern Great Plains Integrator* to others interested in agricultural research in the Northern Great Plains.

To be added to our mailing list, request a copy through our website or contact Audrey Myers by phone (701 667-3001), fax (701 667-3054), or e-mail (myersa@mandan.ars.usda.gov).

(Continued from page 2)

Sheep grazing will not eradicate leafy spurge but can control it while providing a commodity that will enhance the economic viability of the farm/ranch operation. As the sheep remove leafy spurge, more grass production returns for use by cattle.

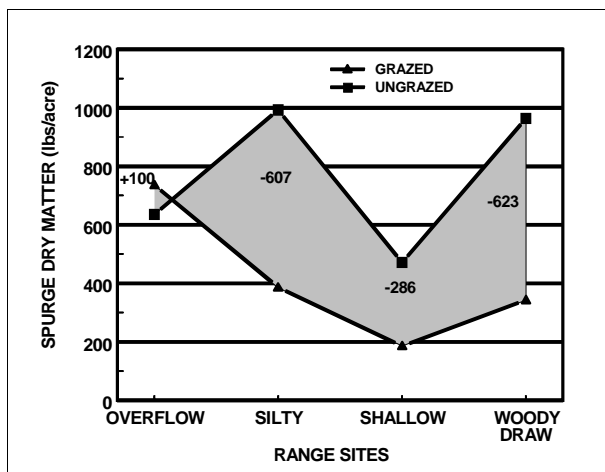
Research at NGPRL continues in cooperation with NDSU on a ten year project to determine the ratio of cattle to sheep needed for continuous control of leafy spurge on infested

rangeland. Sheep should be considered a proper biological control measure for leafy spurge infested range and re-

claimed mine lands.

This paper was recently presented at the 2000 Billings Land Reclamation Symposium in the "Grazing of Reclaimed Lands and Rangeland Health" Session, March 23, 2000, attended by farmers/ranchers, land managers, and scientists.

Control of Leafy Spurge , cont'd.



The shaded area for the range sites shows the amount of leafy spurge dry matter removed by sheep grazing during the 1998 grazing season.

Ron Ries
701 667-3018
riesr@mandan.ars.usda.gov